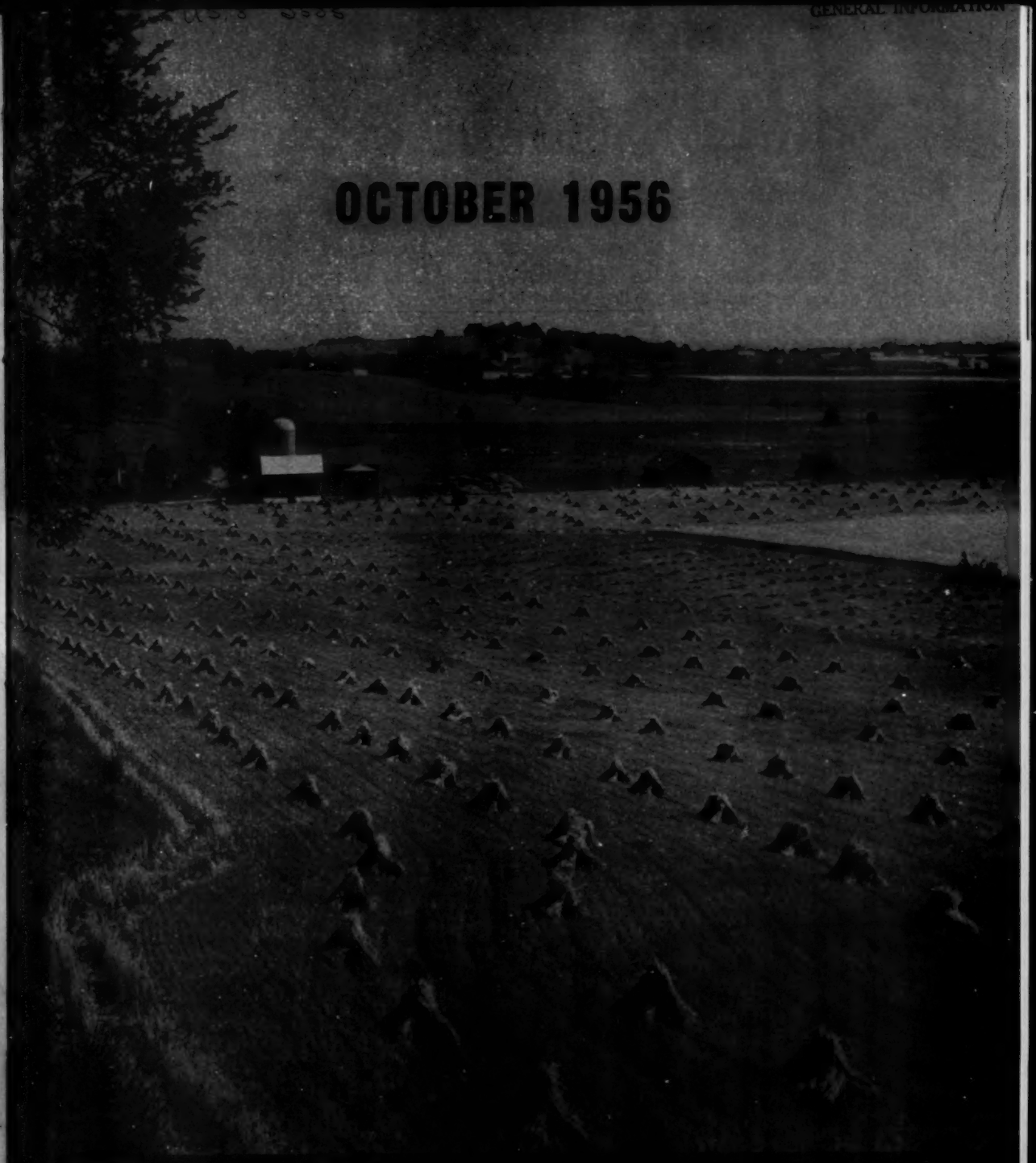
GENERAL INFORMATION

OCTOBER 1956



SOIL CONSERVATION

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SOIL CONSERVATION

OCTOBER 1956
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★ THIS MONTH ★

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SHELTERBELTS FOR NEIGHBORS.—Joe Nilles and Garth Garrett live on adjoining farms near Blanchard, N. Dak. A township road running east and west separates the two farms. Joe Nilles' farmstead is on the south side of this road and Garth Garrett's buildings on the north side.

Joe Nilles had a good shelterbelt on the south side of his farmstead. His buildings were too close to the road to permit an adequate shelterbelt of trees on the north side. Garth Garrett had a shelterbelt on the north side of his buildings, but was too close to the road for a shelterbelt on the south.

They got together. Each agreed to plant a shelterbelt on his own land to benefit the other.

As a result, application was made to the Southeast Traill County Soil Conservation District and the shelterbelts were planted. Both Garth and Joe take pride in caring for these tree belts that serve mainly to help their neighbor.

WALTER G. BOHNSACK

Editors are invited to reprint material originating in this magazine.

FRONT COVER.—Harvest scene in Wisconsin.

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"It Was Timberland All Along"

As their eroded cottonfields of three decades ago were diverted, first to corn, then to cattle pasture, and now are being planted to pine trees many Louisiana farmers are beginning to realize that their land was best suited for timber all the time.

By BARRINGTON KING

TREE planting is spreading like wildfire in Louisiana.

And conversely, thanks to the watchful eyes and educational efforts of the Louisiana Forestry Commission, wildfire is diminishing as interest in tree planting grows.

Soil conservation districts are taking an active part in the big push for better woodland management in the State. They consolidate orders from district cooperators for seedlings and receive bulk shipments from nurseries. Then they deliver trees to individual farmers and collect for the trees as the planting job is done.

Soil Conservation Service technicians assisting the districts are giving technical aid in selecting planting sites, reforesting wornout fields and cutover land, girdling old hardwood stands to release pine reproduction, checking survival, and in thinning and harvesting operations.

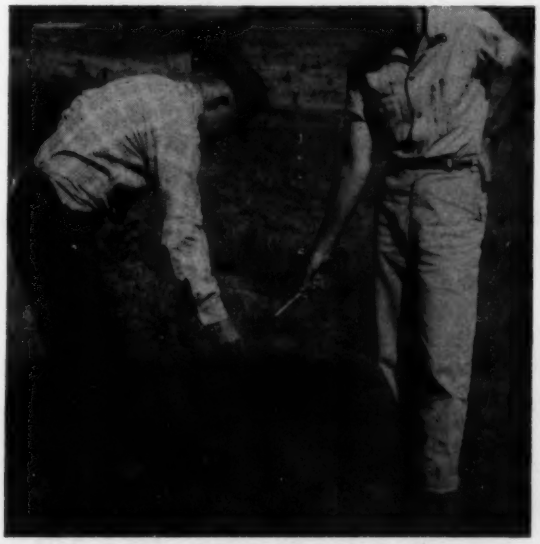
Records compiled by the SCS show that more than 27½ million trees were planted by farmers cooperating with local soil conservation districts during the 1955-56 planting season. This figure includes 12,657,633 trees purchased through soil conservation districts, 11,206,500 purchased by district cooperators directly from nurseries, and 3,669,400 furnished free to district cooperators by various companies, agencies, and others.

To date, 2,424 farmers cooperating with local soil conservation districts have planted 127,367 acres to trees. In addition, 4,041 cooperators have carried out woodland jobs other than tree planting on 461,062 acres. And in all, 5,685 cooperating farmers have completed at least one woodland improvement practice.

State and paper company nurseries are producing trees in record numbers. N. W. Sentell, vice chairman of the Louisiana Forestry Commission says the two State nurseries at Oberline and Sibley produced 42 million pine seedlings during the 1955-56 planting season. They hope to hit the 45 million mark this year.

Sentell is also president of the Southern Pulpwood Conservation Association and chief forester for a bag and paper company. He reports that his company produced 4½ million trees last year and bought another million from the State. This company has furnished nearly 9 million free trees to farmers in a 36-square-mile area during the past 8 years, including 1½ million last year.

"If we are going to give seedlings away," he says, "we want to be sure they're handled and planted properly. The Soil Conservation Serv-



Guthrie P. Martin, left, and Linton Jones of SCS examine a young pine at the beginning of the second growing season.

W. R. Jackson inspects his 4-year-old pine trees on his farm in Bienville Parish, La.

ice is the catalytic agent between the nurseries and the farmers. They've taken a big load off us by seeing that the planting is properly done. And I've never seen a bad job of planting where the SCS was involved."

But just getting the trees planted properly is not enough. They must be protected from fire, too. And that's where the Louisiana Forestry Commission is doing an exceptionally fine job, along with its assistance to farmers in their marketing operations.

"We are reaching a milestone in our forest fire prevention program," Sentell says. "During the last 12 months, our fire prevention officer arrested many people for starting illegal fires and got many convictions and fines."

L. C. Ewing, of Chatham, in the west central part of Jackson Parish, owns 2,000 acres of woodland. He is part owner of 2,500 additional acres and manages 20,000 acres of woodland for other landowners. Ewing, who is 43, indicated how interest in woodlands has grown. "During my lifetime," he says, "I've seen this parish change from row cropping to tree farming."

As a cooperator with the Dugdemon Soil Conservation District, Ewing reports that he has received invaluable help from SCS technicians in woodland planning. This is supplemented by help from the Louisiana Forestry Commission in marking timber and in fire control.

He gave two examples of the kind of assistance received from the SCS. "We had a tract of 80 acres where we were planning to girdle the hardwood and plant pine. We called in the SCS men for advice and they made a check of the tract. They found we had a 65 percent stand of hardwood, so they advised us to farm it as a hardwood stand.

"A widow with 600 acres of woodland asked the district for a management plan," he continued. "SCS technicians developed the plan on the basis of six compartments outlined on an aerial photomap of the land. Now she knows where she will harvest her timber each year, and approximately how much income she can expect over the years."

Banks, too, are getting interested in the economic phases of the booming woodland program. Ewing says he met recently with the directors of the People's Bank of Chatham and they agreed to help sponsor tree planting by taking orders, receiving shipments of seedlings, helping with loans, and so on.

"We want to increase woodland planting in the Chatham area a hundred percent this year," Ewing says.

Paul Stinson, vice president of the Jackson Parish Bank at Jonesboro, and also a district cooperator, was so convinced of the soundness

Homer Watkins, left, and O. O. Moore of SCS look up to some 8-year-old slash pines.

of the woodland development program that he arranged for the bank to buy a tree planter. It was turned over to the district to operate.

The forester's slant on the economic possibilities of sound woodland development is expressed by M. A. Peters, SCS woodland conservationist at Alexandria.

"The thing that impresses me," Peters says, "is that the average timber production in Louisiana is only 50 board-feet per acre per year. But with proper woodland management, this can be increased to 500 board-feet per acre per year.

"You can double the yield of cotton, and corn yields have been quadrupled by the use of hybrid seed and better farming practices," he points out. "But you can increase the average woodland production tenfold. I don't know of any other crop with possibilities like that."

O. O. Moore, SCS area conservationist at Alexandria, who has seen interest in woodlands constantly increase since back in the CCC tree planting days, looks at woodland from the land use viewpoint.

"Half the State of Louisiana is tree land," Moore says. "People in these hills have decided they can't make a living with row crops. But with 50 inches of rain and adapted soil, trees are just about the ideal crop."

Sixteen years ago, Moore stopped by the house of Homer Watkins, who has a 132-acre farm in Jackson Parish. It was a Saturday afternoon, and Moore had been hunting. But as he tramped over the hills, he had been thinking too about what should be done with the rough, eroded land.

"You know what you ought to do," he told Watkins. "You ought to plant about half of this farm to trees."

The idea didn't appeal to Watkins at the time, although the trees were free and the CCC boys would plant them. He reluctantly agreed to allow pines to be planted on 3½ acres of his roughest land.

As he watched the young pines grow, Watkins got interested. A few years later he began planting pines on his own, with the technical help of the local soil conservation district. He has gradually taken his steep land out of cultivation and put it in pines and has spot planted pines in hardwood areas. He now has 24 acres of slash pine in pure stands.

The first planting made in the CCC days is now 16 years old. The trees are 40 feet tall, vigorous and thrifty. Three years ago he got a pulpwood cutting from the 3½ acres that netted him $40 an acre from land that originally cost him $25.

"If I had listened to him back in those days," Watkins said as he nodded his head toward Moore, "I'd have most of this land in pines like that now. Fact is, I expect to have it all in pines in a few more years, by the time I'm 65. I set out 6,000 this year.

"I expect to leave about 5 acres of open land around the house for a garden, on account of my wife. She says she's not going to let me plant pines around the house. In 6 months time, she claims, they'll be so thick we won't be able to see who's going up and down the road."

Linton Jones, left, and Homer Watkins, landowner, examine some 16-year-old slash pines that were planted by CCC boys.

Another old timer who has caught the tree planting fever is Guthrie P. Martin. Martin, who is 76, says he has been planting trees for the past 3 years as fast as he could get the seedlings. He planted 15,000 this year.

"I don't expect to get much from them myself," he explains. "I'm doing it for my children. I want to keep them from missing it like I did. I had a chance at this timber when I was young, but I couldn't read the future."

Martin says he got interested in trees by watching old fields that were being planted. He was planting some trees in a field by his house when Linton Jones, SCS technician in Jackson Parish came by. He told Jones he was interested in planting trees on a 29-acre tract.

Since that time, Martin has planted 50 acres of young pines and has done timber stand improvement work on 74 acres, where with Jones's advice he girdled hardwood overstory to release the pine reproduction.

"He showed me how to plant and how to thin," Martin explained. "And the other day he showed me something I didn't know. If you get the roots bent up, the tree won't grow. And if you're setting 40,000 trees, you might get 1,000 that way, if you don't watch it.

"Another thing he showed me," Martin continued, "was that little gimlet thing they use to get the age of a tree. That shows you how much more you can get if the trees are not shaded or crowded. If you work on your timber, like you do a crop, there's a lot more to it. You can't make any kind of crop with half a stand."

Martin thinks the reason more people are not interested in trees is that it takes so long to learn about tree values through personal experience. He recalls that when he was married 50 years ago, he saw corn growing on wornout fields that are now supporting valuable stands of timber.

"I've been talking to all the young boys, showing 'em where the money is," Martin went on to explain. "A young fellow said to me the other day, 'You can prove anything on paper.' But I told him when you get as old as I am, you don't have to guess about trees, you know."

"I've been in this same area for 65 years," Martin summarized. "I've seen it go from cotton, to corn, to cattle, to timber. Now cattle is going out and it's all going to timber. We have a wonderful country if we just knew it. It was timberland all along."

And judging from the way people in Jackson Parish and many other areas in Louisiana are turning to trees, it is obvious that a lot of them are beginning to think as Martin does.

Can We Save Our Organic Soils?

By JOHN C. STEPHENS

No. 19

This is the nineteenth of a series of articles to appear from time to time in explanation of the various phases of research being conducted by the Department of Agriculture on problems of soil and water conservation.

CITY VEILED IN SMOKE, AIRPORTS CLOSED, MOTORISTS FIGHT PALL

Such headlines in Miami newspapers during April 1956, together with editorials, radio broadcasts, and television programs served notice to the people of Florida's lower east coast that the Everglades was again being ravaged by fire.

The vastness of the Everglades instills a feeling of permanence to a vacationing populace which is shocked with the knowledge that this seemingly ageless swampland, periodically ravaged by raging fires in the past, is slowly, but inexorably, disappearing in the huge clouds of acrid smoke that hang like a pall over the metropolitan areas.

Fortunately, fires in the Everglades of the magnitude suggested in April's headlines are a rarity, and normally burn only during the most severe droughts. Further, much is being done to combat them. Perhaps from a conservation viewpoint occasional fires are helpful. They are spectacular. They make the headlines. They

Note.—The author is research project supervisor, soil and water conservation research branch, Agricultural Research Service, Fort Lauderdale, Fla.

serve notice to the public that Florida's black gold, the rich organic soil of the Everglades, is in danger.

Uncontrolled fire burning in dense sawgrass of the Everglades.

Unknown to the general public, however, it is not fire but the less ostentatious, insidious loss brought about by micro-organisms that consume the organic soils that is the greatest threat to the peat and muck soils of the Everglades.

The main causes of subsidence—loss of surface elevation—in peat and muck soils are: shrinkage due to drying, loss of the buoyant force of ground water, compaction, burning, wind erosion, and last but not least, slow biochemical oxidation. All of these are set off largely by drainage.

Peat and mucks are created only in the presence of nonaerobic micro-organisms that are largely responsible for the transformation of vegetation to peat. Thus, organic soils are formed in bogs, marshes, and swamp forests, or from the moisture absorbing sphagnum mosses.

In the case of the Everglades, the organic soils were formed in a shallow sedimentary trough of limesetone approximately 100 miles long by 40 miles wide, extending southward from Lake Okeechobee to the sea. In past geologic times, Lake Okeechobee, a circular fresh water lake about 725 square miles in area, overflowed its south and eastern rim during the wet seasons.

During the Wisconsin ice age when the seas were around a hundred feet below the present level, the waters flowed unhindered to the coastline. As the glaciers began to melt, about 11,000 years ago, the seas rose in response. Approximately 5,000 years ago sea levels had risen to the extent that fresh water backed up in the Everglades basin rose to a level conducive to the accumulation of organic soils, rather than to calcareous deposits.

Lake overflow, together with an annual rainfall of more than 60 inches, moved slowly through the thick vegetation over the almost level plain to escape eastward through a few small rivers cutting through the east coast barrier ridge, to pass eventually to the sea through dense mangrove forests at the tip of the peninsula.

Near the rim of the lake, silt, clay, and organic colloids were carried in suspension to intermix with the remnants of plants to form mucks. In the ancient floodways, along the margins of the swamp, submersed aquatics formed a light, almost flocculent, sedimentary type peat.

The vast majority of the Everglades soil, however, was derived from sawgrass and related marsh plants, that formed a light, felty, brown-fibrous, low moor peat with low mineral content. This peat, when drained, properly fertilized, and augmented by minor elements, breaks down into an excellent field soil. Today this soil, together with the mucks, constitutes one of the richest agricultural regions on earth.

The annual agricultural return from this area—even in its relatively undeveloped state—is estimated at approximately $50 million. It is truly black gold. However, if soil subsidence continues at present rates, most of these organic soils will be worthless for agricultural purposes in less than 50 years.

Early attempts to drain the Everglades were made as long ago as 1850. They were not effective and water levels stayed high enough to maintain anaerobic conditions which permitted buildup of the organic soils to continue. Beginning about 1906, this condition was upset by

The top of this concrete monument was level with the ground surface when the marker was placed in the peat soil of the Everglades in 1924.

the installation of canals leading from Lake Okeechobee to the sea. While drainage was unsatisfactory from the standpoint of farming, the water balance was disturbed to a point where aerobic, or oxidizing, conditions prevailed.

Thus the processes of accumulation were reversed and depletion of the soils began. In 1940 when the Soil Conservation Service began its investigations in the Everglades Drainage District the "Glades" were aptly described by a local farmer as "the biggest, flattest, blackest, sometimes the wettest, and again the driest and burningest area you ever saw."

Today, permanent benchmarks established at the ground line by earlier investigations now stand several feet higher than the land and furnish visual evidence of soil loss. A concrete monument set at the Everglades Experiment Station in 1924 shows a subsidence of 3¼ feet uring a 30-year period. This has occurred on land completely protected from fire. It is a necessary practice at the experiment station, where the houses are built on piling, to add a new step about every 10 years as the ground subsides.

The normal pattern of subsidence has been established by running periodic surveys over selected profile lines. The first profiles were run in 1916. Each line is approximately 1 mile long and begins at a permanent benchmark. Normal procedure is to resurvey these lines every 5 years, whereby the average elevation over the entire length of the line gives the ground height at the time of survey. These elevations are plotted as a function of time and show graphically the rate of soil subsidence.

Surveys made by different drainage agencies for the upper Everglades agricultural area show a total loss of soil volume of about 40 percent during 40 years of drainage. This area consists of soils suitable for agricultural development according to Soil Conservation Service land capability surveys. Essentially, this area is a thousand-square-mile tract of sedge peat and muck soils that were 5 feet or more deep at the time of survey. They directly overlie adamant limestone and embrace an area surrounding the southern portion of Lake Okeechobee.

It was found that soil losses were greatest near the main drainage canals where wide subsidence valleys were formed along either side of the channels. However, lands remote from the immediate drainage influence had also subsided and losses in the undeveloped lands were almost as great as in the lands under cultivation.

Fire has been a factor contributing to losses in the wild lands, but on farmlands fires usually are extinguished before they do much damage. Wind erosion may be troublesome on individual farms, but the Everglades area is so large that soil blown from one field usually drifts to another field.

The fact that oxidation is the main culprit causing soil losses has been established by studies on water table plots at the Everglades Experiment Station, Purdue Experiment Station, and other controlled plots.

At the Everglades Station in 1934, a field of Everglades peat was divided into 8 blocks, 100

x 240 feet, and provided with a system of ditches, underdrains, and check dams so the water table could be held at any uniform depth desired. All blocks were uniformly cropped at the same water levels the first year to determine any soil variability. Levels were run and soil samples were taken to establish ground elevations and soil density for each block.

Water levels ranging from 12 to 36 inches deep and varying about 6 inches between blocks were held from 1936 to 1943. Surface levels were rerun and peat samples obtained each year to determine elevation losses and any compaction changes. Soil gases were also collected and quantitatively analyzed.

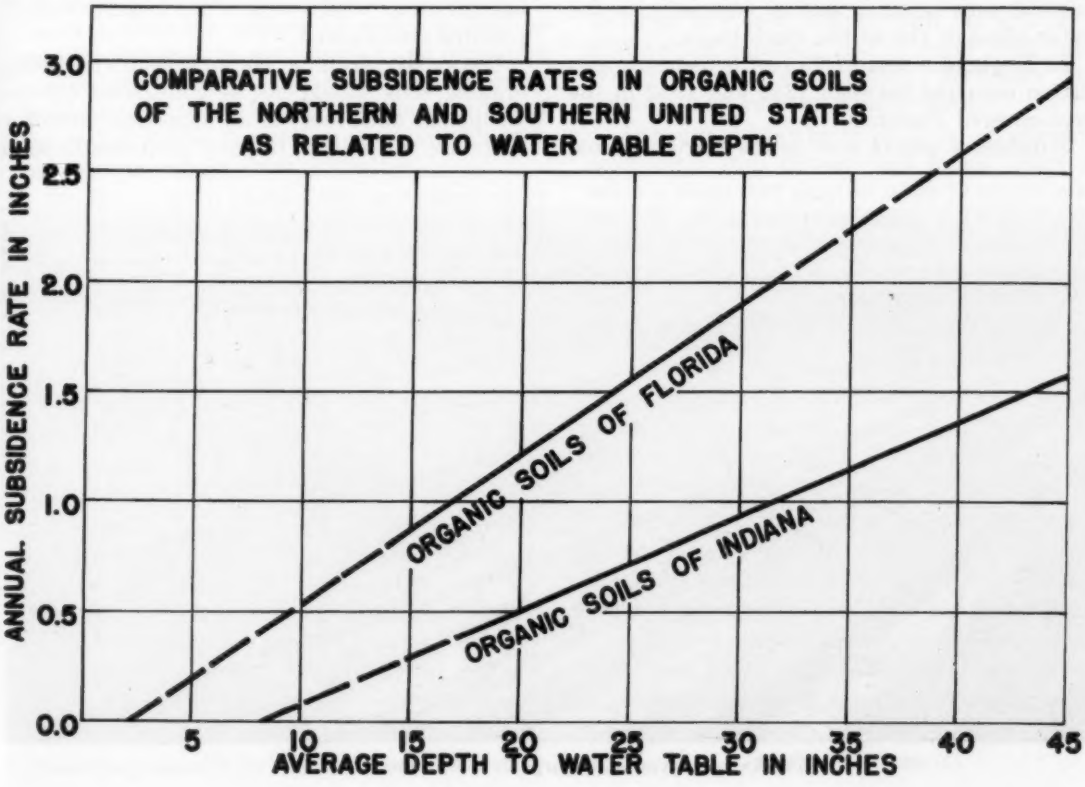
The rate of subsidence was found to be directly dependent upon the depth to the water table—the higher the water table the lower the soil loss and vice versa. The density and mineral content studies showed compaction to be a minor factor, and a check on implanted metal reference plates showed that all soil losses took place above the water table. From the soil gas analysis it was found that the production of carbon dioxide (CO_2), a byproduct of oxidation, was in direct relation to the amount of soil loss.

For average water table depths of 12 inches, 24 inches, and 36 inches the corresponding annual subsidence rates were about 0.6 inch, 1.4 inches, and 2.3 inches. Results of these studies are summarized, along with similar studies in Indiana, in the accompanying graph.

All studies point to the conclusion that with continued subsidence, the organic soils in the upper Everglades will probably be too shallow to support a paying agriculture by the year 1990—at least, an agriculture of the present pattern.

The question, "Do other organic soils subside with drainage?" often comes up. When answered in the affirmative, the next question is: "How do losses in other areas compare with recorded losses in the Everglades?"

The losses vary, but a few examples will give a clue as to what to expect. At Purdue University's Muck Crop Experiment Station, on con-



trolled plots similar to those at the Everglades Experiment Station, the rates of subsidence for like depths of water tables were about half those for Florida. However, due to climatic differences, the prescribed water table was held year-round in the Florida experiments, while in the Indiana experiments the water table was controlled during the crop year from May to September.

In the organic soils of the Sacramento-San Joaquin Delta of California it is reported that the average rate of subsidence is slightly over 3 inches a year with no indication that this rate is decreasing. Those soils are tule reed peats with an average remaining depth of from 10 to 12 feet.

In Michigan losses in surface elevation on organic soils ranged from 0.0 to 0.7 foot over a 5-year period. Near Hennepin County, Minn., the total settling varied from 0.5 foot to about 1.1 feet with the variation being approximately proportionate to the depth of water table.

In the Great Meadows muck area of New Jersey subsidence has uncovered the underlying mineral soils in many places, especially on the outer edges or rim of the muck basin.

In England a loss of 10 feet 8 inches in elevation occurred between 1852 and 1932 in the peat-covered Finlands.

Subsidence occurs even in the extremely cold climate of Norway. A report shows a loss of 4 feet 11 inches in 65 years for cultivated bog soil at Stend Agricultural School in Hordaland County. From this and observations on 33 parishes, an average loss of about 0.8 inches per year was shown.

In the laboratory studies samples of low moor peats (those with pH's from neutral to basic) about 20 percent of the dry weight was decomposed in a period of 19 months at a moisture content of about 70 percent. Most of the loss was accounted for as escaped CO_2. It was found that the organisms causing decomposition were active only when soil temperatures remained about 40°F.

Soil destroying bacteria were found to be highest in drained low moor peats and lowest in the extremely acid, high moor peats. However, when the acid peats were limed, manured, and put under cultivation, the micropopulation increased to about the same as that in the low moor peats under similar drainage.

So far, all studies point to the certainty of organic soil loss when drained. Thus, the original question, "Can we save our organic soils?" remains unanswered.

Obviously, from a conservation viewpoint, organic soils should not be considered for development until there is an immediate need for their use. If needed, the first step should be to

Truck crop harvest on the organic soils of the Everglades.

determine if the soil is suited for the intended crop. In general, the acid peats are less valuable for most farm crops than the high lime peats; although special crops such as cranberries may be grown on acid peats, and some acid peats may be made productive by the addition of considerable lime.

As a general rule, fibrous and woody peats are better for agricultural use than the sedimentary and moss peats. Most mucks contain mineral admixtures, which are more likely to supply potash and the microelements needed for plant growth, that tend to make them inherently more fertile than the peats.

It should be emphasized that organic soil should be at least 3 to 5 feet deep to justify drainage costs where the underlying material is hard rock or other untillable material. Where the peat or muck overlies fertile, tillable soil the situation is different, and even shallow bogs may pay for cultivation.

Once organic soils have been drained, well regulated water tables offer the best means of minimizing subsidence. Each farm, therefore, needs a complete system of water control to provide drainage in wet weather and irrigation during dry weather. Control of ground water levels is desirable not only for conservation of the soil, but also for attaining maximum crop production, and for frost protection.

Reports of crop yields from controlled water table plots indicate that a water table of 24 to 36 inches is desirable for most field and truck crops, but that mint, celery, canes, and pasture grasses will do best at shallower water tables of 18 inches, while grain and field corn may require deeper water levels up to 40 inches for best results. In arid regions these levels may be higher and in humid regions lower. In any event, the water table should be held as high as crops and field requirements will permit.

It is evident, however, that even with farm water tables controlled for optimum crop production, the rate of subsidence will still continue at an undesirable rate. On seasonably cropped lands where winter temperatures are not low enough to halt bacterial action, such as the Everglades, flooding during the idle season will lengthen the life of organic soils.

Growing water-tolerant crops such as rice or kenaf would add many years to the life of peat soils. However, numerous research and development problems must be solved before many of the more water-tolerant crops can be grown commercially on organic soils.

Using the carbon 14 radioisotope method, the age of the Everglades soils was found to be 5,000 years. This represents an average accumulation of about 1 foot of peat in 400 years. When it requires only 10 years for the same amount of soil to be lost by oxidation the value of plowing under litter or cover crops for combatting oxidation losses is doubtful.

In fact, some studies indicate that the increased aeration with a consequent buildup in bacterial population from turning under green manure crops results in increased oxidation losses. On the other hand, it has been observed that the incorporation of heavy woody plants may improve the soil structure and tend to stabilize it against wind erosion.

The use of a roller to firm the soil is beneficial in reducing soil loss from both blowing and oxidation. Also, compaction allows the roots to come in closer contact with the soil. It facilitates the capillary rise of water from below, which benefits germination, decreases frost hazards, and reduces wind erosion.

Although it may be impractical at present to completely stop organic soil losses, there are several steps that may be taken to obtain maximum benefits from these soils: (1) Provide adequate water control facilities for keeping water tables as high as crop and field requirements will tolerate; (2) drained lands should be placed in productive use as soon as possible; (3) research should be intensified to develop practices that may prolong the life of these soils.

An increased public awareness of the seriousness of the subsidence problem with the consequent increase in the use of better water control practices may add to the life of peat and muck soils. In general, however, large scale abandonment of such areas as the Everglades in the not too distant future is the logical result to be expected in the light of present knowledge. Furthermore, to varying degrees the same ultimate fate may be in store for drained organic soils the world over.

(Continued on page 72)

Urbanization of Farmland

About a million acres of productive farmland is nonagricultural uses as suburban homes, highwa urbanization developments. This increasing tre many new problems to soil conservationists and concern in the fut

By D. A. WILLIAMS

NO longer may the problems incident to the growth of our towns and cities and the extension of our streets and highways be looked upon as matters that can be left to taxing, utilities, and other authorities or bodies concerned with just the physical developments themselves. Urbanization, in the broader sense of good land taken out of agricultural production, has been jumping across farm fence lines too fast and far to be ignored by rural landowners or anyone else concerned with the Nation's agricultural economy.

Even a casual check of the day-by-day news confirms this rapidly growing urbanization trend. You are reminded of it when you read, for example, of a Congressional bill that allows Washington metropolitan police and firemen to live as far as 20 miles from the city instead of within the 12-mile area to which they were limited. The Bureau of the Census says 1 out of 7 workers in the United States lives in and commutes from another county than the one in which he is employed.

The impact of urbanization also is reflected in such reports as that of Montgomery County, Md., adjoining Washington, D. C., where more than 32,000 dwellings were constructed between 1950 and 1956. The Census Bureau reports a 77 percent gain in the county's population during this 6-year period. Or take Fairfax County, Va., another Washington suburb, about which the Virginia Agricultural Experiment Station recently published a warning that the stripping away of topsoil and vegetation, and the building of houses on the flood plain as part of the expanding suburban development is paving the way for serious flooding. Fairfax County's population increase since 1950 has been nearly 80 percent.

The story is much the same throughout the Nation where bulging urban and industrial centers push out into the surrounding countryside.

Note.—This article is based on a talk made by the Administrator of the Soil Conservation Service to the Northeastern Branch of the American Society of Agronomy, June 1956.

...f Productive ...mland

...arm...and is being diverted each year to such ...nes, highways, airports, factories, and other ...reasing trend toward urbanization presents ...onis...and will become of greater and greater ... in the future.

Census figures show that virtually all of the increase in the country's civilian population from 1950 to 1955 was in the metropolitan areas. Significantly, the rate of growth was seven times as rapid in the outlying parts of those metropolitan areas as it was in the central parts of those cities. Still more significant is the fact that growth in the outlying parts of the metropolitan areas was greatest in the territory classified as rural in 1950.

The question is whether we can afford to go on considering our productive agricultural acreages as expendable, or whether we can take steps to minimize the permanent conversion of our better farmlands to urban and other nonagricultural uses.

It is a problem of common concern to agricultural scientists and city planners. It is a problem that demands increasing attention from individual landowners and their local and State governments. It is a problem for the research, educational, and technical brains of fhe Nation.

We in the Soil Conservation Service frequently have come squarely up against this matter of agricultural land use dislocation. Several years ago, for instance, an entire soil conservation district near Phoenix, Ariz., had to be disbanded because its farmland was swallowed up for other uses. Today, in places like the South Camden area in New Jersey, the spread of suburban environs is shifting the workload of SCS technicians more and more from conventional conservation farm planning and application assistance.

Recognizing the need for measuring the urbanization and related problems of agricultural land conversion, the Service last year made a State-by-State study on the conversion of cultivable land to other uses. The study showed that every year more than 1 million acres of cultivable land in the United States is going into such uses as urban subdivisions, industrial sites, defense establishments, highways, and airports. During the last 15 years, the study indicates that approximately 17 million acres of our flattest and most fertile farmlands, that is, in land capability classes I to IV, have been converted to such nonagricultural use.

That represents almost 3 percent of all land suitable for cultivation in the United States. If these withdrawals continue for another 15 years at the present rate—and the trend is slightly upward—a total of about 100 million acres of land that once was suitable for cultivation will have been converted to nonagricultural use, including about 80 million acres that have now been so converted.

More than 2 million acres of cultivable land have been converted to nonagricultural uses in the last 15 years in the northeastern States of Maine, Vermont, New Hampshire, Massachusetts, Connecticut, Rhode Island, New York, New Jersey, Pennsylvania, Delaware, West Virginia, Maryland, and Virginia. Of the land suitable for cultivation in these States, from 10 to 25 percent has gone into city developments and suburbs, factories, airports, highways, and other nonagricultural use.

About one-fourth of the cultivable land in New York State, for example, has been removed from cultivation. The trend continues upward at a fast rate in the Northeast generally, though the rate of conversion for New England has been lower than for some other section of the country, probably because of comparatively slower population gain in recent years in that area of long-standing high population density.

It is when we examine specific local situations that what is happening is brought home to us. In making the agricultural land withdrawal study, we found in Montgomery County, Md., that a total of more than 37,000 acres of Class I to IV land had been converted to other than agricultural use in the last 15 years. Better than 12,000 acres of it was for public development and 16,000 acres for private development. That represents 14 percent of the county's 268,700 acres of cultivable land.

In Baltimore County, Md., with its 126,000 acres of Class I to IV land, the 22,000 acres withdrawn for public and private developments in the past 10 years represents more than 17 percent of land suitable for cultivation converted to nonagricultural use in that period. That is to say nothing of the more than 75,000 acres of such land estimated to have been shifted over previously in this county.

Another drain on former farmland is the superhighways like the Pennsylvania and Ohio turnpikes or the New York Thruway. These superhighways require 50 to 60 acres of land to the mile, and ordinary first-class highways require 25 acres or more. When we stop to think of the many thousands of miles of these highways built in recent years, of the highways under construction or planned, we begin to get an idea of the extent and complications of the land conversion problem. The projected new interstate highway system alone calls for 42,000 miles of modern highway construction.

The growing competition for good land, between farmers and special users, parallels the increasing competition for available water supplies, among agricultural, urban, industrial,

A suburban development on class I and II land while less valuable land around it remains undeveloped.

transportation, recreational, and other users. With our population already at the 168-million mark and headed for upward of 200 million within the next two decades, we obviously are going to continue to need more building space, highways, and so on. That poses an especially pressing problem in the Northeast, where nearly a third of the Nation's population already is centered. But the problem is not confined to the Northeast. The Southeast, the Midwest, the Pacific Coast, and even the broad stretches of Texas and other Southwestern States are also affected.

As you know, home construction, industrial, and other users look first for the best land sites —usually good, arable land. They do so because level land involves lower construction costs, less troublesome drainage and water disposal problems, easier highway grades, room for long airport runways, and so on. Modern stores and factory plants require much larger land areas than they used to, and more and more land goes into automobile parking areas and the like.

Urbanization and industrialization of agricultural land sets up a chain reaction that extends right down to the field of interest of every one of us. As land use changes from agricultural to residential or commercial, tax valuation rises on all land within the affected area. Those continuing to farm there are trapped in an urban economy with unaccustomed assessments for community improvements and services, rising taxes and other costs, and consequently lower net returns on their farming operations.

As urbanization extends farther into agricultural areas, the pressures upon local and State taxing units increase for more schools, sewers, and other necessary community facilities and improvements. The tendency then is to increase real estate taxes on the remaining agricultural land, thus intensifying the problem for farmers.

As the pressure increases for putting the remaining farmland into building lots or other nonagricultural uses, farmers hesitate to establish conservation farm plans or to put in needed improvements such as drainage or irrigation systems. They have little incentive to follow good liming, fertilizing, and other programs because such practices won't add to the price of the land for nonagricultural uses. Also,

The owner of the farm in the foreground recently completed a drainage ditch, but now regrets the expense as he sees his neighbor's farm across the road being developed as an urban area.

as the better cultivable land shifts to other uses, and as food demands rise at local urban market points, food production inevitably shifts more and more to lands that are less suitable for cultivation.

The fact we have to recognize is that the farmers in these situations no longer can run their farms the way they used to operate them. And that patently means that we, as soil conservationists, can't go to the farmers in such changing land use areas with the kind of agricultural programs that are suited for the regular, undisturbed farming areas.

But we must remember this: The fact that a substantial percentage of the good farmland in urbanized areas goes under roof, concrete, or asphalt does not mean there no longer are soil and water conservation, agronomic, forestry, or agricultural engineering problems to be dealt with in the watersheds involved. If anything, these problems are increased in this process of changing the hydrologic pattern of whole watersheds, or parts of watersheds.

In some places of urban expansion, up to a third of an area's land surface has been taken out of farmland, pasture, or woods and covered with paving, houses, and other surfaces that

This former walnut orchard was valued at more than $1,000 per acre as agricultural land, but it is valued still higher as suburban homesites.

produce almost 100 percent water runoff with a high flood potential. In other places, stream courses have been changed or their channels restricted for residential or industrial purposes. Only complete conservation treatment of the watersheds above those points can relieve the continuing flood threats thus created. In the meantime, more intensive and efficient management and use of remaining agricultural lands in urban areas is called for by the increased pressure of local markets, particularly for vegetables, dairy, and poultry products.

Another fact we need to face is that we don't yet have agronomic and other technical programs adequately tailored to meet the unique needs of areas heavily checkerboarded with agricultural and urban land use. We are lacking particularly in full data needed in developing and carrying out "urbanized agriculture" assistance programs with maximum benefit to landowners, watersheds, and communities, and with maximum utilization of our technical manpower and other facilities.

That is one of the reasons the Soil Conservation Service made the agricultural land-withdrawal study. Further essential information bearing on this part of the country's increasingly complex trend in land and water use will result from a recently authorized national inventory of soil and water conservation needs. This inventory will be made and kept current by the Department with the cooperation of State and local agencies.

Much research also needs to be done along agronomic lines and in engineering and other fields to find further answers to the productive management of lands in urbanized areas, both agricultural and nonagricultural, and dealing with accelerated floodwater runoff. One side of the problem, for example, is that of developing means that will enable owners of former farmland tracts, who decide to hold onto them for suburban development instead of farming them, to maintain economical protective cover on such land.

The Soil Conservation Service in meeting its responsibility for land treatment is trying to find plants that the research people ordinarily pass over because of their lack of farm utility. As a result of such activity during the last 20 years in nurseries and plant materials centers, land users today have available some 60 or 70 adapted conservation plants that they did not have before; and many more undoubtedly will be added to this "conservation plant bank."

One of the most dependable "tools" we have available to work with is the soil survey. On the basis of the soil survey land capability determinations are becoming more widely available as a guide to the various interests, governmental or private, that may be or should be working to protect our good farmlands for agricultural use.

Although we don't have all the answers to the drain on agricultural land through urbaniza-

Ordinary modern highways consume 25 to 30 acres of land per mile; many of the four lane superhighways consume twice that much.

tion, it clearly is possible to use less productive lands for factories, suburban home sites, and so on. Also, it is feasible in many cases to select routes for highways so as to bypass the best agricultural lands.

By using soil survey and land use capability information and other data as they are accumulated, we can find a surprising amount of land not suitable for crops that is available for many of these nonagricultural purposes.

Policies that will make it possible for our economy to expand without unnecessary encroachment upon our productive croplands need to be developed. In some localities, attention has been given to zoning ordinances as a device to help guide more orderly development of industrial and urban expansion.

Linwood L. Lee of the Soil Conservation Service looks at a "For Sale" sign in a luscious alfalfa field growing on Class I farmland.

We must realize, of course, that we can't hope to deal with each and every individual involved in urban developments. But we can deal with the municipal council, town, or other units concerned. That is the way the matter has to be approached essentially, because individual small suburban property owners can't solve these land and water problems alone anyway. Big industry, military, highway, recreational, and other interests, on the other hand, can do a great deal to meet some of these problems as independent problem units, if they are given the incentive for doing it and can obtain the necessary technical information or assistance.

An important job of education is involved—not only of individual farmland owners and operators in urbanized localities, but of communities themselves.

Fortunately, there has been a rapidly growing community approach to soil and water and other resources conservation problems in recent years. It is particularly evident in soil conservation districts in dealing with basic soil and water problems, and in community watershed developments on a local-State-Federal partnership basis through the Upstream Watershed Protection and Flood Prevention Act.

Such available community conservation machinery can help cope effectively with important problems like urbanization of agricultural lands. How effectively depends in a large measure upon the local understanding and desire and the initiative taken by State governments and by affected individuals and communities.

It also depends in no small measure upon the continued and ever closer teamwork of all agencies and interests—government and private; local, State, and Federal; research, educational, technical, and financial. Whether we are soil conservationists or agronomists, engineers or foresters, soil scientists or biologists, we have a growing opportunity and responsibility to devote our best talents to the urbanization and other resource conservation and utilization problems that challenge us.

BETTER DAYS THROUGH BETTER WAYS.—The Future Farmers of America are following their creed of "Better days through better ways," in South Carolina by participating in land judging contests.

More than 7,000 boys received training in soil judging and land use last year. Of this number, 26 teams of 4 boys each competed in the State finals held in March. All teams had taken part in federation eliminations. The team from Bamberg High School, coached by W. C. Huiet, won first place. Another team from this same school won first place in the State in 1955 and won second place in the national contest.

The training of students was done mainly by vocational agriculture instructors. Sponsors for the contest were: Carolina Power and Light Company, Champion Paper and Fiber Company, South Carolina Association of Soil Conservation District Supervisors, Union Bag and Paper Corporation, West Virginia Pulp and Paper Company, and International Paper Company.

Soil Conservation Service technicians helped with training schools for all teachers of agriculture in South Carolina to prepare them to train their students.

—E. N. MILLER, JR.

JO ANN KNOWS ABOUT TREES

In McCurtain County, Okla., school forests provide outdoor classrooms for conervation experience, funds for special projects, and community inspiration.

By CHARLES P. BURKE

"THE southern forest impressively demonstrates that trees are a renewable crop," says Jo Ann Watson, an eighth grader at Beachton School in northern McCurtain County, Okla. The statement is quoted from her prize-winning paper in a recent forestry theme contest. What does Jo Ann know about southern forests? What does she know about tree crops? Where did her interest in forestry get its start?

In McCurtain County three schools, at Beachton, Brushy Ridge, and Smithville, have their own school forests. Beachton and Brushy Ridge are small rural grade schools. A consolidated high school operates at Smithville. All three are in the heart of the southeastern Oklahoma pine country.

First requests for the initiation of school forest projects were made to the Little River Soil Conservation District in 1954. Timberland owners in northern McCurtain County submitted the idea to the district supervisors and offered forest tracts for the school forests. The project was presented to the respective school boards and teachers through the supervisors. The response was immediate, enthusiastic, and favorable.

J. D. Bates is a soil conservation district cooperator and a large forest landowner in Oklahoma, Arkansas, and Louisiana. He furnished 40-acre woodland tracts to the Beachton and Brushy Ridge schools. A 10-year renewable contract was signed as a basis for school use of the areas. Another cooperator, the timber growing firm of McKee, Story, and Wilson made 80 acres available to Smithville High School on a similar basis. Each landowner-school lease called for cooperative agreements between the schools and the Little River District. Forest management plans, suitable for school forest operation, were also required. Before the end of 1954 all agreements and conservation plans were completed and in effect.

All three school forests were dedicated with appropriate ceremonies in January 1955. Students and their teachers, school patrons, school boards, the landowners who made the tracts available, Soil Conservation Service technicians, representatives of forestry industry, and district supervisors were present at the dedications. The Little River Soil Conservation District furnished attractive marble markers for each school forest. These were put in place during the dedications. The Beachton, Brushy Ridge, and Smithville schools also became cooperators with the Little River Soil Conservation District.

The next big event was the 1955 school forest harvest. Each school scheduled a special day on which to cut the products. Each forest had been divided into annual cutting compartments with just one compartment cut each year. Net incomes from the cuts the first year were from $35 to $105. Labor was donated by the pupils, teachers, patrons, and school board members.

The trees to be cut had previously been designated with tree marking paint. Before cutting began, all present were instructed on the reasons for marking. At Smithville High School, senior class boys did most of the marking under

Jo Ann Watson (left) and Rachel Goings of Beachton school peeling posts as a part of the school forest harvest.

Note.—The author is woodland conservationist, Soil Conservation Service, Hugo, Okla.

the direction of the SCS woodland conservationist and conservation aid. The products selectively harvested consisted of pine posts and pulpwood. Cull hardwoods or weed trees were eliminated by axe girdling, or by use of a tree injector. The tree injector is a special tool recently invented for injecting tree killing chemicals beneath the bark. The school forests were pioneers in using this tool for forest improvement in McCurtain County. Now, more than a dozen of the injectors are in operation.

In addition to labor, the local people donated trucks for transporting the products to market. The youngest workers were not more than 8 or 9 years of age, the oldest were about 70 years old. People who do not live in or near the woods might find it hard to believe—most of the post debarking, or peeling, was done by the girls or women. One of the teachers was a near-champion in numbers of posts peeled.

At each school forest harvest, a highly competitive spirit soon developed. Most of the workers, from the largest down to the smallest, gave their best effort.

Money returns from the harvests go to the schools. Last year, at Beachton, the money was used for an educational trip for seventh and eighth graders. Brushy Ridge applied their school forest money on equipment for a new hot lunchroom. At Smithville High School, the senior class each year uses their harvest fund for the annual senior class trip.

Selective cutting in the 1956 compartments also eliminated weed trees. A new method of cull hardwood was used at Smithville, a gasoline-powered girdling machine.

All three schools added pine planting to their projects in 1956. Two thousand pine seedlings were planted on the Smithville school forest. A thousand were planted on each of the other forests.

At Smithville, Harvest Day activities were filmed for WKY-TV presentation. A special chartered bus brought visitors from towns in southern McCurtain County. Adult participation increased greatly and money returns showed an increase.

The school forests are a going concern, dedicated to good conservation and use. The pupils are becoming junior tree farmers. Some of them are sure to grow into adult tree farmers.

Betty Jene Fairless of Brushy Ridge school, another winner in the forestry theme contest also peels her share of posts at the school harvest.

They will remember the conservation lessons learned in their own school forests.

According to Dick Piner, chairman of the Little River district board of supervisors, "With 853,000 acres of woodland in McCurtain County needing continual protection and management, these school children will help to lead the way."

Yes, Jo Ann Watson from Beachton, knows about trees as a crop. She can speak with authority. Other youngsters, and some oldsters, at Beachton, at Brushy Ridge, and at Smithville, are also learning about wood as another farm crop—how to grow and protect it—harvest it—and benefit from it.

RANCH TRAINING PROGRAM.—Texas Christian University starts a 9-month course in ranch training this fall. Their catalog says: "This is not a textbook course. It is a field study, through observation of and participation in the activities of many outstanding ranches of the Southwest."

Enrollment is limited to 15 students during the first year. Those under 21 years of age must be high school graduates; those over 21 will be accepted regardless of previous formal education.

Subjects studied will include: breeding and feeding livestock, grassland management, livestock marketing, soil, water, and wildlife conservation, and general ranch management. The director of the ranch training program is Arthur H. Courtade, a former conservationist of the Soil Conservation Service.

Don't Burn Stubble

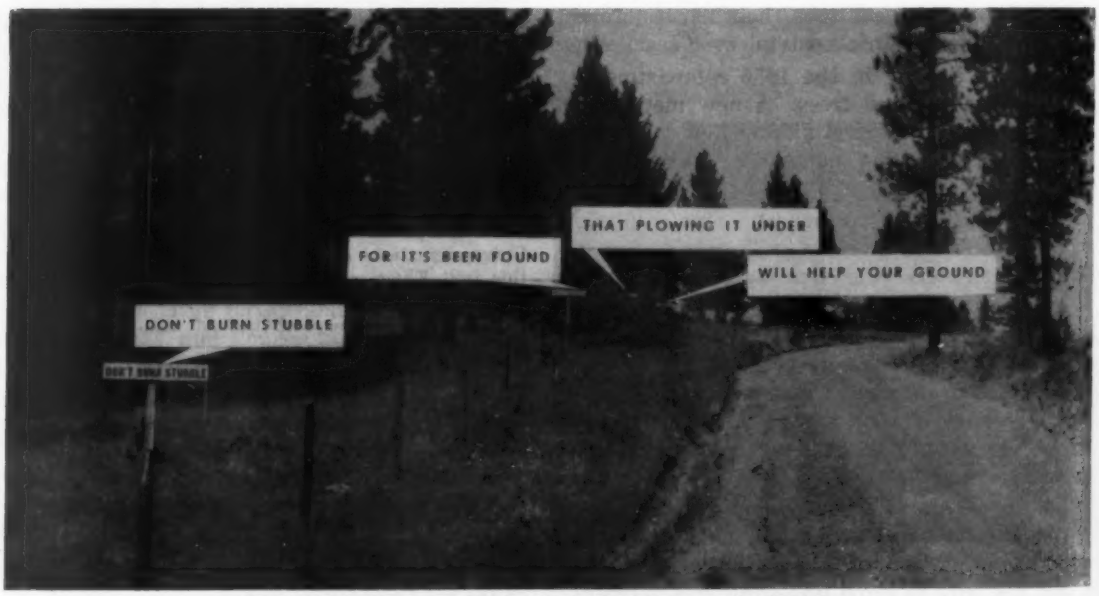
By HUGH F. EAMES

FOR many years stubble-burning had been a serious problem in the Lewis Soil Conservation District and other grain growing areas in Idaho. In 1945 about 45 percent of Lewis County grain and barley stubble was burned. When the soil conservation district started its program it made war on stubble-burning one of its top priority projects. The efforts were effective: burning was steadily reduced until in 1953 fire consumed only about 11 percent of the annual production of stubble and straw.

Last year the district supervisors decided that 11 percent was still too much; so they made studies for new methods that would pare it down. Using the popular old roadside shaving sign idea, they mapped out a campaign.

Chairman Don Baldus got the Riverside Lumber Company to donate enough lumber to build the road signs. One rainy day, Baldus and Soil Conservation Service technicians Ken Riersgard and Wayne Shaeffer, made the signs and painted slogans. Shaeffer did the lettering on 4 sets of 5 signs for each supervisor. Five men—Baldus, Wynne Henderson, Andy Goin, Joy Woodruff, and Daland Baker—agreed to post the hundred signs along the county roads and main highways throughout the district and take them down after fall plowing season.

When August came and grain harvest started the first signs were placed along the roadsides. Along with this a school poster contest and newspaper campaign were carried out. The publishing of 5 different posters was started in 2 county newspapers, a different one appearing for 5 successive weeks. The district paid for newspaper cuts, technicians wrote text to go with each, and newspapers took care of the rest of the job. As a third step, copies of



Roadside jingles in the Lewis (Idaho) Soil Conservation District.

jingles and other broadcasting material went to radio stations.

The schedule was set up so that one step would be started in each of the last 3 weeks of August. In this way, farmers were exposed to the material, in one form or another, from before grain harvesting until after fall plowing, when the stubble-burning period ended. Progressively, series of roadside signs told stories like this: Don't Burn Stubble, For It's been Found, That Plowing It Under, Will Help Your Ground. Others were such as these:

Don't burn straw
Like Grandpa did
Help save the soil
For your own Grand Kid

Chop it or bust it
Or let it stand.
But don't burn your stubble
For the good of your land.

The *Nez Perce Herald* and *Lewis County Register*, weekly newspapers published by Ernest Conger, swung the newspaper end of the campaign, while radio stations KORT at Grangeville, KRLC at Lewiston, KRPL at Moscow, and KWSC carried frequent short announcements.

Altogether, the campaign cost the Lewis Soil Conservation District $35, only what it paid out for cuts and other materials. The SCS technician put in 68 man-hours of work. Miracles were not expected, but when the season was over and district supervisors measured effects, they found that stubble-burning had been reduced to about 4 percent of the wheat and barley acreage. This is about a third of what it was 2 years earlier and a twelfth of what it was in 1944.

LIVING GRASS EXHIBIT.—A feature of the State Fair Park in Oklahoma City, Okla., is a living exhibit of 55 species of grasses, forbs, and legumes native to that State. The exhibit is sponsored and maintained by state chapters of the Soil Conservation Society of America, the Oklahoma Seedmen's Association, and the Oklahoma State Fair and Exposition. It is frequently used as an outdoor laboratory by FFA and 4-H groups for identification of useful native plants. Several groups of foreign students have also studied and admired the exhibit.

Grass, Cattle, and Trees in North Dakota

By CURTIS L. LOUCKS

GRIMSI GOODMAN and his sons plan for their 2,150-acre farm to provide gainful employment through the winter as well as other seasons of the year. They help gain this objective by properly using grass, and by planting field windbreaks to hold snow on the fields and to protect them from wind erosion.

The Goodman farm is located north of Milton, in northeastern North Dakota, just 20 miles south of the Canadian border. The farm is a third generation enterprise. Grimsi took over the ownership and operation of this unit when it was a 320-acre farm. It had been his father's homestead. Later purchases by him and his sons enlarged the farm to its present size.

Note.—The author is work unit conservationist, Soil Conservation Service, Langdon, N. Dak.

Grimsi Goodman.

A great deal of work was needed to bring this farm to its present level of production. Pastures had to be improved, water supplies for livestock had to be developed, waterways in a number of fields required leveling and seeding to grass. Some clearing of rocks and brush on cropland was necessary. It was all accomplished without neglect to the soil. The conservation program consisted of proper land use, establishment of good conservation practices, and the use of commercial fertilizers.

After the mechanical practices were completed on the cropland, a cropping sequence with grass and legume rotations was developed.

There is 1,600 acres of tillable land on the Goodman farm, but the striking difference between it and the average farm is the small acreage of land fallowed each year. Less than 10 percent is fallowed, as compared to 30 percent or more for the average farm of the county. As a general rule summer-fallow is done only on cropland that has become heavily infested with quackgrass.

The sequence of crops is potatoes, 2 years of wheat, barley, oats, and flax. All crop residues are worked back into the soil and no burning of stubble is permitted. After this series of crops are produced a grass-legume mixture, usually alfalfa and bromegrass, is planted and used for hay or pasture. After 3 years, this mixture is plowed under and the crop sequence mentioned above is again used. This system permits the alfalfa and brome to remain on the land for approximately one-third of the time.

A major phase of the soil conservation program is establishment of 3-row field windbreaks at intervals of a quarter of a mile. These are planted crosswise to the prevailing winds. Three varieties of trees are used, consisting of 1 row each of Caragana, golden willow, and green ash. Rows are spaced 13 feet apart so they can be cultivated with regular farm machinery. These trees also serve to keep drifting snow off the roads as well as to protect cropland from wind erosion. A small number of native plum trees are interspersed in the plantings to provide food for wildlife.

By the spring of 1956, 4½ miles of windbreaks were established. Generally, at least half a mile is planted each year and will be continued until the belts are all planted. The local soil conservation district plants the windbreaks under the supervision of Soil Conservation Service personnel assisting the district and the farmer.

Before the native wooded pastures could be economically used, they had to be renovated. First, most of the scrub oak and elm trees were removed with a bulldozer, the largest trees being left for shade. Then a heavy brush disk was used to eradicate the remaining brush. After this operation was completed it left the surface broken so as to provide a seedbed suitable for seeding to a grass-legume mixture.

Shorthorn cattle on Goodman farm with farmstead in the background.

Again alfalfa was included in the mixture with bromegrass. This practice could only be performed on the bottoms of the coulees and on some of the gentler slopes. The erosion hazard was too great to warrant brush removal on the steeper coulee banks. The brush that remains not only protects the slopes from erosion, but it makes a good wildlife habitat. In all, 110 acres were improved in this manner. It resulted in increasing the production of the pasture from 8 acres per animal unit to 3 acres per animal unit for the grazing season.

In order to obtain the maximum use of these pastures a water supply had to be developed for each pasture. It was done by the use of both dams and dugouts. Coulees were dammed to provide 2 of the stock water ponds, and reservoirs were dug where seeps or runoff would keep them filled, to provide the other 3 watering places.

Grassland not utilized for pasture is cut for hay or grass-silage and stored near 1 of the 2 main feed lots. One of the feed lots is located in the bottom of a large coulee near the farmstead. It is arranged so that 1 man can feed 125 head of cattle in less than 1 hour. The lot features an automatic watering device, a large hay storage shed complete with dryer, and a conveniently located trench silo. It is well protected from wind and drifting snow from all directions and is commonly referred to as one of the most ideally developed feed lots in northeastern North Dakota. The purebred herd of shorthorn cows is wintered in this lot and the 120 calves are held in the feed lot at the farmstead. After the cows are moved out to pasture with their new calves, the yearlings are put into the coulee feed lot to be finished for market later in the summer.

The farmstead shows just as much improvement as the rest of the farm. One farmstead windbreak was planted several years ago and another was planted in May 1956. A spacious lawn is well kept and beautified with ornamental trees, shrubs, and flowers. The road into the farm is kept surfaced with shale and gravel so that it can be traveled at any time.

A grain dryer is incorporated with the farm grain storage elevator. Grain can be threshed with moisture contents far in excess of that normally considered safe for storage, and it is then dried to a safe moisture content. This device helps the Goodmans to grow high quality certified seed grain.

Grimsi Goodman is 1 of the original 3 members appointed in 1947 to serve as a supervisor of the East Cavalier Soil Conservation District. He still holds his position as a supervisor and for the past year has served as chairman of the board of supervisors. His interest in soil conservation demands a great deal of his time. He attends district supervisors meetings regularly, has attended all of the area and state soil conservation district supervisors meetings, as well as several national district supervisors conventions. He has also devoted much time to the Tongue River Watershed Protection Project that the East Cavalier Soil Conservation District supervisors is cosponsoring.

One son is in the armed service, and the other two are at home. Glen, the eldest, is married and lives in his own house on the same farmstead. Grimsi and his sons are partners and share in the business of running the farm, so it is under management at all times even though one or more of them may be away.

This farm was picked as 1 of the 3 winning farms in the Soil Conservation Achievement Contest, sponsored by the Greater North Dakota Association, and is often chosen as the farm on which judging contests and workouts for 4-H Clubs are held.

SELECTIVE CUTTING.—Members of the County Line Missionary Baptist Church near Nashville, Ark., have learned how to make their 32-acre pine woodland pay off indefinitely. In learning, they have made a convincing case for selective cutting of woodland. In 1939, when the first cut was made, the area was divided into two 16-acre plots. One of these plots was clear cut, the other was selectively cut according to suggestions made by the Soil Conservation Service.

The history of the two plots since 1939 tells the story. In 1945 the selectively cut area yielded 20,000 board feet of logs that netted the church $400, and in 1950 a cut of 55,000 board feet netted $3,052. An estimated 60,000 board feet of merchantable timber worth around $3,500 remains on the land. The clear cut tract has not yielded any merchantable timber since 1939 and it will be several years before this tract is in production; it now has approximately 10,000 board feet of merchantable timber worth $500.

The 16-acre tract selectively cut has produced at the rate of $14.50 per acre per year for the past 16 years. The 16-acre clear cut tract has produced at the rate of $2 per acre per year during the same period.

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HEAVY EQUIPMENT DEMONSTRATIONS.—Heavy contractor-sized equipment is being used on Wisconsin farms in a series of demostrations on land forming, sub-soiling, and deep plowing,, according to Al Wojta, University of Wisconsin soils specialist. Equipment is made up of out-sized plows, disks, land levelers, bulldozers, and subsoilers that cut the soil anywhere from 12 to 18 inches deep.

The project has been set up to study effect of the deep tillage and to determine value of mixing fertilizers at deeper than normal plow depths. Equipment is on loan from contractors. The Soil Conservation Service is cooperating in the trials.

Wojta points out that farmers in the red clay area of eastern Wisconsin may save $100 an acre in the cost of tilling, by using the deep plow system to improve drainage. He also feels it may be possible to get cheaper forage production by extending the life of forage seedings with deep tillage.

CAN WE SAVE OUR ORGANIC SOILS?

(Continued from page 59)

Heretofore, research efforts have been directed primarily toward the development of better water control techniques. Such work has been, and will continue to be, of immense benefit in minimizing subsidence; but at best, precise control of water levels is only a palliative.

To augment these studies, basic research designed to get at the fundamental causes of the destruction of organic soils as influenced by different environmental conditions and treatments should be stepped up. It may be that the soil microbiologists can come to the aid of the research engineers with a better understanding of the micropopulation of the soil and suggest possible means of regulating them to a point where they will not consume the organic material faster than is necessary for making needed nitrogen available for optimum plant growth.

MORE BUNNIES FOR BEAGLES.—C. L. Holliday of Grundy County, Tenn., owns a pack of beagles that he likes to hear run. His problem was how to have good rabbit races in the time he could spare from his mortuary business. This meant he couldn't afford to waste time looking for bunnies. So Holiday called on E. L. Holder, Soil Conservation Service technician with the Grundy Soil Conservation District, and told him what he had in mind. Holder was interested because of the land cover angle. Whether the cover is used to grow beef or bunnies doesn't matter so much to him as long as it protects the land. So Holliday and Holder set out to plan a conservation program for Holliday's 26-acre tract.

In less than a year, Holliday had seeded 4 acres to ladino clover and orchardgrass, which he limed and fertilized; seeded 2 acres of rough, eroded land to sericea; planted three small patches of loblolly pine; set out multiflora rose along his line fence; planted two bush lespedeza borders next to woods; and protected the entire area from forest fires.

He then asked neighbors not to shoot the rabbits. He explained to them that he was doing this work to get bunnies for beagles, not for the pot.

Rabbits are already showing up on the place.

—C. M. HENNINGER AND E. L. HOLDER

SOIL STEWARDSHIP.—The Reverend Richard K. Morris, pastor of the Baptist Church in Knoxville, Pa., is one of the outstanding conservationists in the Tioga County Soil Conservation District. He regularly attends and takes an active part in meetings of the soil conservation district and the Cowanesque Watershed Association. He preaches sermons on conservation and emphasizes the moral and spiritual as well as the material benefits of conservation. He makes radio talks about conservation and outlines tours on which members of his congregation may see the results of erosion and the benefits of conservation.

The Tioga district directors frequently call on Pastor Morris to assist in their educational program. He also acts as an adviser and salesman for some of the retiring farmers of his congregation who wish to sell their farms. He states: "I want to be sure that the buyers are conservation farmers."

—WILBUR THOMAS